

**IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF VIRGINIA  
Richmond Division**

DANAHER POWER SOLUTIONS, L.L.C.,	)	
	)	
Plaintiff,	)	
	)	
v.	)	Civil Action No. 3:07CV167-HEH
	)	
POWER DISTRIBUTION, INC.,	)	
	)	
Defendant.	)	

**MEMORANDUM OPINION**  
**(Claim Construction - "Circuit Board")**

This is declaratory judgment action involving claims of patent non-infringement and invalidity brought by Plaintiff Danaher Power Solutions, L.L.C. ("DPS") against Defendant Power Distribution, Inc. ("PDI"). PDI brings a counterclaim of infringement. The action is before the Court for the construction of the term "circuit board." Both parties have filed memoranda of law in support of their respective positions, and the Court conducted a claim construction hearing on July 31, 2007. For the reasons below, the Court construes "circuit board" to mean "an insulated board on which electrical components are mounted and interconnected to form a circuit."

**I. Background**

This dispute centers on DPS's alleged infringement of PDI's patent titled Branch Circuit Monitor, U.S. Patent No. 6,330,516 ("the '516 patent"). The '516 patent describes a system for monitoring the power quality and energy consumption for branch circuits, which are individual circuits that "branch" off from a panel board or circuit breaker box attached to a main power line. The system utilizes non-contact current sensors that are wired to a digital signal processor

module, which avoids having to attach a separate meter to each branch circuit to be monitored. The claimed invention requires that the sensors be “mounted on a circuit board positioned near to said panel board or circuit breaker box.” ’516 Patent, col. 5, lines 3–5. The parties have indicated that their dispute may be resolved upon the Court’s construction of the claim term “circuit board,” which is found in Claim 1, the ’516 patent’s only independent claim.

In addition to the claim language quoted above, the term “circuit board” is mentioned at four places in the patent specification, but no definition is given. The specification describes three drawings as including “printed circuit boards” on which the non-contact sensors are located and states that the arrangement of the “sensors and circuit boards” may be varied. At some point during the prosecution of the ’516 patent, the applicant amended the claim term “printed circuit board” to read “circuit board.”

Several definitions from technical treatises and dictionaries were cited by the parties in their briefs. The Institute of Electrical and Electronics Engineering, Inc. (“IEEE”) defines “circuit board” to mean a “flat piece of insulating material, often multilayered, constituted of epoxy-glass or phenolic resin, on which electrical components are mounted and interconnected by etched copper foil so patterned as to form a circuit.” The Authoritative Dictionary of IEEE Standard Terms (7th ed. 2000). The Microsoft Press Computer Dictionary defines “circuit board” to mean a “flat piece of insulating material, such as epoxy or phenolic resin, on which electrical components are mounted and interconnected to form a circuit.” Microsoft Press Computer Dictionary (3d ed. 1997). Another source provides that a “circuit board” is “[a]n insulated board on which interconnected circuits and components such as microchips are mounted or etched.” American Heritage College Dictionary, (3d ed. 1997). Finally, “circuit

board” has been defined as “a sheet of insulating material used for the mounting and interconnection (often by a printed circuit) of components in electrical equipment.” Random House Unabridged Dictionary (2006).

Based on the aforementioned evidence, PDI argues that “circuit board” should be defined broadly to mean “a board on which components are mounted.” On the other hand, DPS argues that “circuit board” should be defined narrowly to mean “a board with an insulating layer or substrate, non-contact sensors mounted on that board, and transmission of electrical signals from sensors through conductive paths or circuits located on or within that board.” The Court finds neither definition to be appropriate, as explained below.

## **II. Standard of Review**

Claim construction is a question of law for the court to decide. *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 372 (1996). Generally, claim terms are given their “ordinary and customary meaning.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (internal quotation marks omitted). “[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application.” *Id.* at 1313. Construing the disputed terms begins with a review of the intrinsic evidence, including the language of the disputed claim, the other claims, the specification, and the prosecution history. *Id.* Courts may also consider extrinsic evidence, which includes all other evidence, such as expert testimony, dictionaries, and learned treatises. *Id.* at 1317.

The specification has been characterized as the “single best guide to the meaning of a disputed term” and is usually “dispositive.” *Id.* at 1315 (internal quotation marks omitted); *see*

*United States v. Adams*, 383 U.S. 39, 49 (1966) (“[I]t is fundamental that claims are to be construed in the light of the specifications and both are to be read with a view to ascertaining the invention.”). Thus, “[t]he construction that stays true to the claim language and most naturally aligns with the patent’s description of the invention will be, in the end, the correct construction.” *Phillips*, 415 F.3d at 1316 (quoting *Renishaw PLC v. Marposs Societa’ per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998)). “A claim construction that excludes a preferred embodiment, moreover, ‘is rarely, if ever, correct.’” *SanDisk Corp. v. Memorex Prods., Inc.*, 415 F.3d 1278, 1285 (Fed. Cir. 2005) (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996)).

Although considered less reliable than intrinsic evidence, extrinsic evidence can help the court determine what a person of ordinary skill in the art would understand claim terms to mean, but it should not be used to support a construction that contradicts the intrinsic evidence.

*Phillips*, 415 F.3d at 1318–19.

### III. Analysis

The parties’ proposed constructions raise two central points of contention: (1) whether the board must be electrically insulated, and (2) whether the board must include conductive paths located on or within the board. DPS urges the Court to adopt both limitations. PDI argues for neither.

In accordance with the principles explained above, the Court begins its analysis by looking at the claim language. The only reference to the term “circuit board” is found in claim 1 of the ’516 patent. Claim 1 provides in full:

1. A branch circuit monitor for monitoring parameters of power

on each of a plurality of branch circuits extending from a panel board or circuit breaker box, said panel board or circuit breaker box including a plurality of circuit breakers arranged to distribute power from a main line that is terminated within the panel board or circuit breaker box to a plurality of branch circuits, comprising:  
a plurality of non-contact current sensors arranged to monitor currents in wires of branch circuits extending from said panel board or circuit breaker box, said non-contact current sensors surrounding said branch circuit wires; and  
a controller module,  
wherein the controller module is connected to an output of the non-contact current sensors, and wherein the controller module is arranged to process, for each of said branch circuits, currents measured by the non-contact current sensors, and  
wherein said non-contact sensors are mounted on a circuit board positioned near to said panel board or circuit breaker box.

'516 Patent, col. 4, line 52 to col. 5, line 5. The specification does little to expound on the term "circuit board," other than to describe the preferred embodiment as a "printed circuit board." *See* '516 Patent, col. 4, lines 15–16.

The prosecution history gives some guidance. A claim in the original patent application recited "printed circuit board," however, in a Preliminary Amendment Before Examination, the applicant amended the term to read "circuit board." DPS Memo. in Supp., Ex. M, at 2 (Oct. 18, 2000). The applicant then distinguished a prior art patent by explaining that the prior art "does not disclose or suggest . . . mounting of the non-contact branch circuit current sensors on a separate circuit board." *Id.* It appears, therefore, that the applicant intended the term "circuit board" to be construed to include more than just printed circuit boards.

Based on the intrinsic evidence in this case, it is appropriate to consider extrinsic evidence to determine what a person of ordinary skill in the art would understand "circuit board"

to mean in 2000, on the effective filing date of the application. *Phillips*, 415 F.3d at 1318. The Court first considers the proposed limitation requiring the board to be insulated. The majority of the definitions presented by the parties require the board to be electrically insulated in some way, and the Court finds that a person with skill in the art would understand “circuit board” to mean an “insulated board.” PDI cites two definitions that lack the word “insulated.” PDI Resp. 9. Both definitions, however, require a material upon which “chips” or “printed or integrated circuits” can be mounted or installed, which would require some form of electrical insulation.

To support its argument, PDI relies on an article that describes the use of metal circuit boards. *See* PDI Resp. 10–11. While a metal substrate can be used in a circuit board, even the example cited by PDI shows a metal substrate that is electrically insulated. *See* PDI Resp. 11 (stating that “[i]nsulated metal substrates have been in use for thirty years”). The Court’s construction does not exclude metal circuit boards by requiring the board to be insulated. It merely requires the board, whether it has a metal substrate or not, to be electrically insulated in some way, such as by having an insulating layer, so that electrical components can be mounted on the board and interconnected to form a circuit.

Next, the Court considers the limitation requiring the board to include conductive paths located on or within the board. To begin, the Court finds that it would be inappropriate to import the “printed” limitation found in the preferred embodiment into the claim term “circuit board.” *See In re Am. Acad. of Sci. & Tech. Ctr.*, 367 F.3d 1359, 1369 (Fed. Cir. 2004) (“We have cautioned against reading limitations into a claim from the preferred embodiment described in the specification, even if it is the only embodiment described, absent clear disclaimer in the specification.”). It is particularly inappropriate given that the word “printed” was removed from

the claim language during prosecution, apparently broadening the claim.

While the parties appear to agree that printed circuit boards have conductive paths located on or within the board, the more appropriate question here is whether the term “circuit board” must be interpreted to include only boards with such conductive paths. While the Court recognizes that most circuit boards do have such paths, the Court finds that the term “circuit board” should not be limited only to boards having conductive paths on or through the board. For example, a perf board may have no such conductive paths, but still fit within the Court’s construction of “circuit board.” Further, the majority of the definitions cited by the parties do not include the conductive path limitation. Accordingly, the Court finds it inappropriate to impose such a limitation on the term “circuit board.”

#### **IV. Conclusion**

For the reasons stated above, the Court construes “circuit board” to mean “an insulated board on which electrical components are mounted and interconnected to form a circuit.”

An appropriate Order will accompany this Memorandum Opinion.

/s/

Henry E. Hudson  
United States District Judge

ENTERED this 13<sup>th</sup> day of AUG 2007.  
Richmond, VA